

SPACE PROPULSION SYMPOSIUM (C4)
Propulsion System (1) (1)

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TECHNOLOGY DEMONSTRATION OF MAIN PROPULSION SYSTEM FOR REUSABLE
SOUNDING ROCKET**Abstract**

A fully reusable sounding rocket is proposed in ISAS/JAXA to provide opportunities for atmospheric observation mission with low cost and short turnaround time, and also to improve technology readiness levels for reusable space transportation systems. This rocket will take off vertically, reach to the high altitude more than 100 km, land on the launch site vertically, and be launched again within 24 hours. The main propulsion system of this rocket is clustered LOX/LH2 engines with full-time abort capability in spite of the one engine fail. In order to realize the reusable sounding rocket, the main propulsion system should have advanced features of high reusability, reusability, maintainability, and survivability. To fulfill those requirements, followings have been considered and reflected in the engine system design, i.e., optimization of design margins among components for high reliability and reusability, deep throttling capability for vertical landing, and health monitoring capability for abort operation, easy inspection and maintenance for short turnaround time. The engine performance and related advanced features are going to be verified and demonstrated through ground engineering tests. In this paper, the current status of technology demonstration of main propulsion system for the reusable sounding rocket is presented, including the details of concepts for engine system design and the ground engineering test plan.